MEASUREMENT/TECHNICAL REPORT

PRASTEL

FCC ID: ON3MRRE

November 2nd, 1999

This report concerns (check one): Original grant __X__ Class II change____

Equipment type: RECEIVER (ex.: computer, printer, modem, etc.)

Deferred grant request per 47 CFR 0.457(d)(1)(ii)? yes _____ no __X__

If yes, defer until: _____
date

Company Name agrees to notify the Commission by _____
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by: P.Antonio VELO Giuseppe MECCHIA

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1 GENERAL INFORMATION

1.1 Product Description

EUT is a receiver designed to be connected to access control central unit as a radio reader; it works on 433.920 MHz frequency.

The code received from the transmitter is re-sent to the output terminals according to the format and protocol selected by means of the programming dip-switches.

The formats available at the output are those most commonly used in access control systems.

It is provided with an antenna connector to be used with the wire antenna provided or with an external antenna.

1.2 Related Submittal(s)/Grant(s)

None

1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Model & Serial No.	FCC ID	Description	Cable Descriptions
MRRE (1) s/n EMC-99-0277	**ON3MRRE**	**Receiver**	**Unshielded power cord** **Unshielded signal cable**
Comelit 542024T s/n 408390	none	AC adapter	Unshielded power cord
ANT/433SD	none	External antenna	Coax cable
M/2000 E s/n none	none	Access control unit	Unshielded power cord Unshielded signal cable
GVC GREEN753 s/n GND967190060	DK4GREEN753	Notebook	Unshielded power cord Unshielded signal cable
ILAN F1560-P s/n 9602	none	AC adapter for notebook	Unshielded power cords
DM 119 s/n 3031602	DYKDM119	Printer, parallel I/F	Unshielded power cord Shielded signal cable

(1) EUT submitted for grant.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the ANSI C63.4-1992 test procedures . Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

TÜV QSL test site No. 3 (semi-anechoic chamber)

The semi-anechoic chamber test site and conducted measurement facility used to collect the radiated data are located at Via Montalenghe 12, Scarmagno, Italy. This site has been fully described in a report dated March 25, 1997 submitted to your office, and accepted in a letter dated August 4, 1997 (31040/SIT-1300F2).

1.6 Test equipment list:

Test receiver	Rohde & Schwarz ESH3	s/n 881364/012
LISN	Schwarzbeck NNLA8120	s/n 8120399
Test receiver/spectrum anal.	HP 8568B+QP adapter	s/n 2601A02134
Biconical antenna	Tensor 4104	s/n 2222
Log-periodic antenna	Electro-metrix LPA-25	s/n 1117
Spectrum analyzer	HP 8562A	s/n 3043A05627
Horn antenna	EMCO 3115	s/n 3572

2 PRODUCT LABELING

Figure 2.1 FCC ID Label

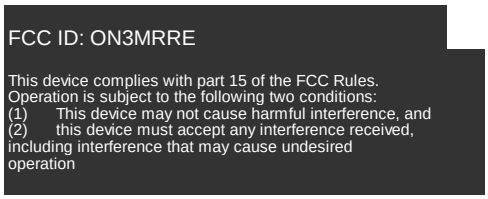


Figure 2.2 Location of the Label on EUT

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The EUT was configured for testing in a typical fashion (as a customer would normally use it).

In order to simulate a real application, an access control central unit has been connected to its output; this has been done by connecting terminals D0, D1 and Ground of MRRE with the corresponding ones on the M2000E.
An external AC adapter (commercial type) supply the 24Vdc necessary for receiver and central unit operation.
The RS232 port has been connected to a Personal Computer (Notebook).

A typical signal, sufficient to stabilize the local oscillator of EUT, has been provided and supplied to EUT by an antenna in the close proximity.

Both the wire and the external ANT/433SD antennas has been scanned, final measurements have been carried out with the external antenna connected.

Conducted emission tests have been performed on external AC adapter power line cable.

3.2 EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The signal provided to the antenna of receiver generate an output of data to the access control unit (indicated by flashing led's on it) and to the PC. When the receiver MRRE receives a signal from an admitted transmitter send a frame to a PC through its serial port. The frame is composed by 13 characters having a generic protocol which can be personalized by the end user.
Software used: Visual Basic Terminal software.

3.3 Special Accessories

None. EUT is housed in a plastic box.

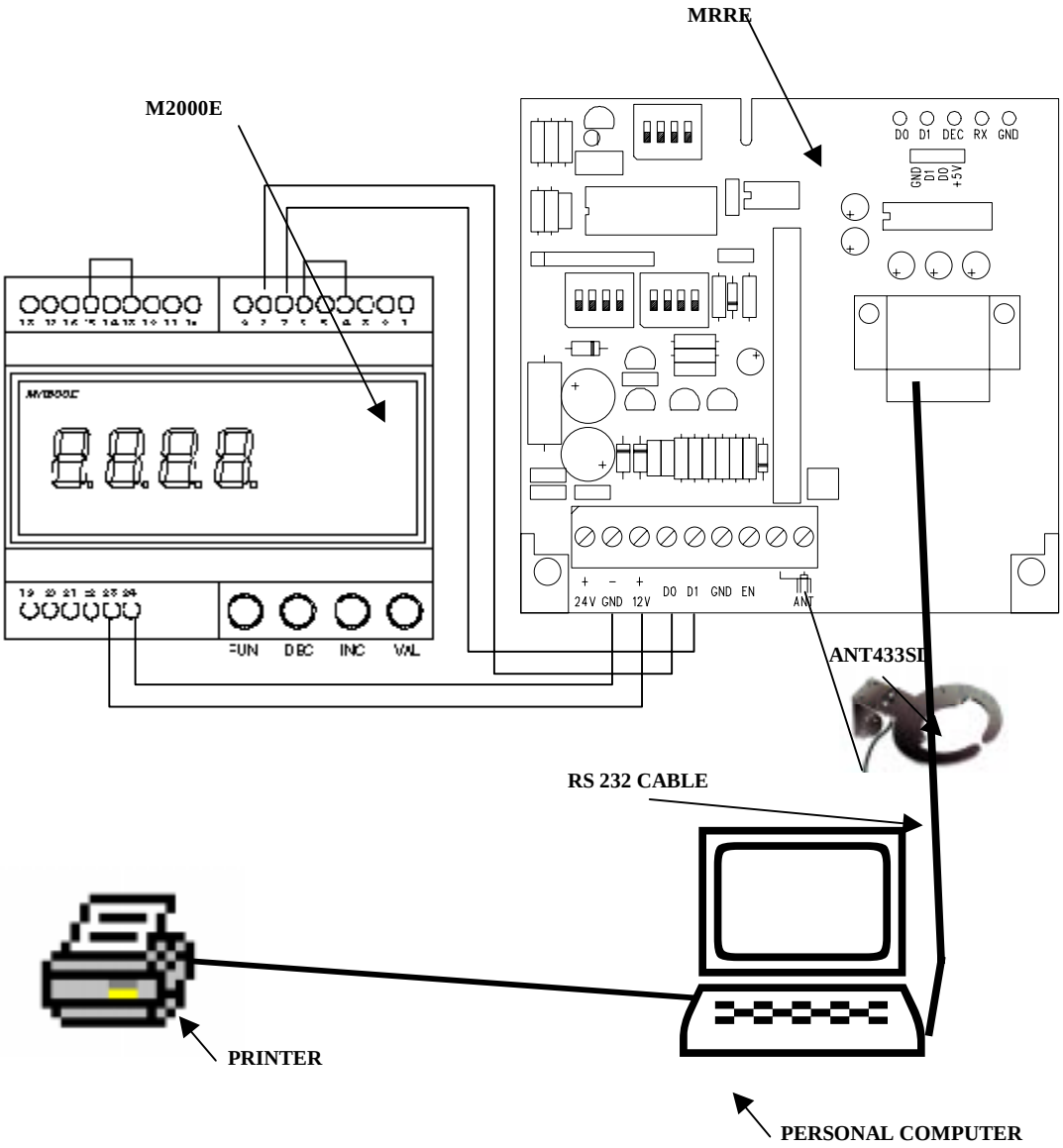
As shown in Figure 3.1 all interface cables used for compliance testing are unshielded as normally supplied by Prastel Company or as readily available on the market.

3.4 Equipment Modifications

To achieve compliance to Class B levels, no changes were made during compliance testing.

3.5 Configuration of the Tested System

Figure 3.1 Configuration of the Tested System



4 BLOCK DIAGRAM(S) OF THE EUT

4.1 Block Diagram Description

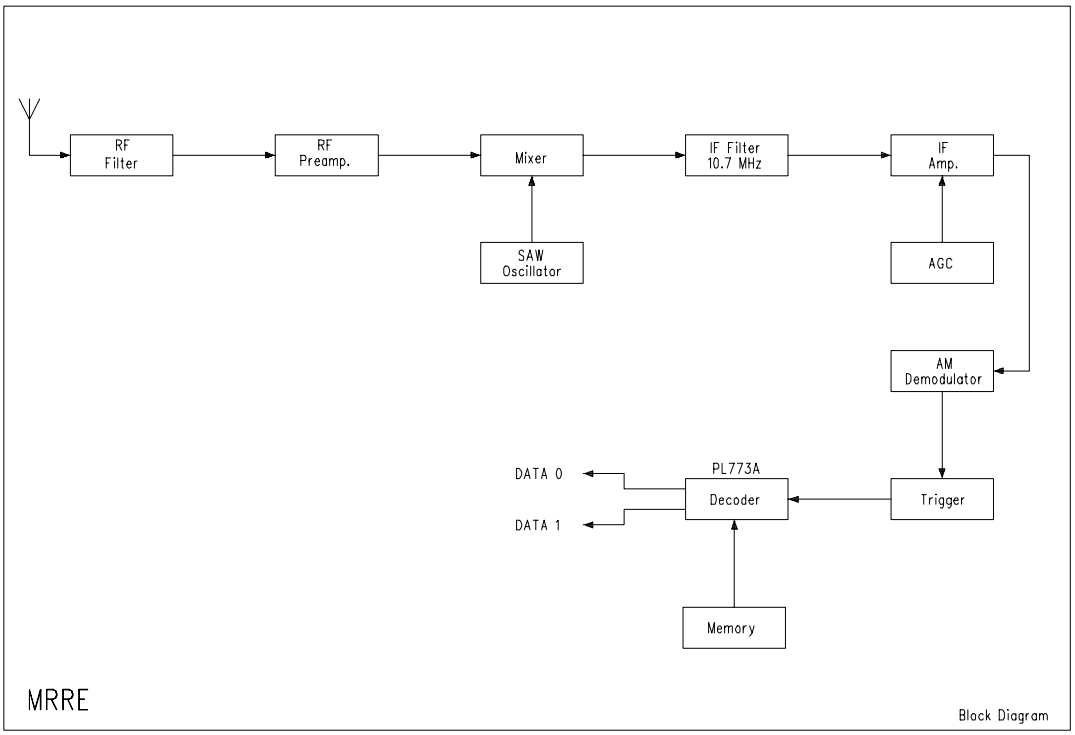
The Controller Board of the EUT is provided with:

- ceramic resonator X1 = 4 MHz

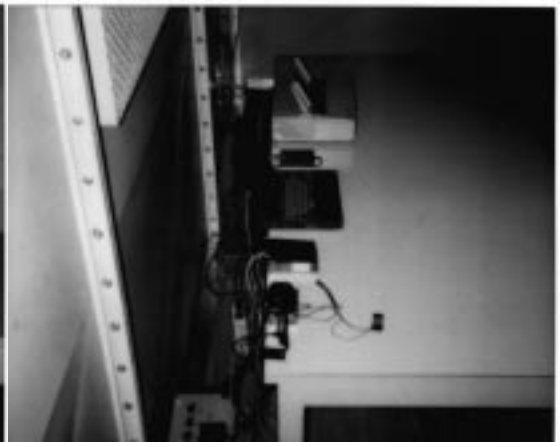
Contained in PL118 radio module:

- SAW resonator SAW2 = 423.22 MHz
- Ceramic filter 10.7 MHz

Fig. 4.1 - Block Diagram of the EUT



5 CONDUCTED AND RADIATED MEASUREMENT PHOTOS



6 CONDUCTED EMISSION DATA

6.1 Tests of the worst case configuration.

The conducted tests are performed with a receiver in quasi-peak mode.

	Frequency (MHz)	Measured* (dBµV)	Limit (dBµV)
neutral	0.48	38	48
	0.58	37	
	2.8	46	
	11	38	
	16.6	44	
	22.1	38	
line	0.48	37	48
	0.58	36	
	2.8	47	
	11	39	
	16.6	43	
	22.1	39	

* All readings are quasi-peak

Test Personnel:

Tester Signature _____ Date September 29, 1999

Typed/Printed Name Giuseppe MECCHIA .

7 RADIATED EMISSION DATA

7.1 Tests of the worst case configuration

The following data list the significant emission frequencies, measured levels, correction factors (including cable and antenna corrections), the corrected reading, plus the limit. Field strenght calculation is given in paragraph 7.2.

Judgement: Passed by 1 dB

Frequency (MHz)	Polarity (V/H)	Receiver* Reading (dBµV)	Correction Factor (dB/m)	Corrected Reading (dBµV/m)	3 Meter Limit (dBµV/m)
43.9	V	25.2	11.8	37	40
114.7	V	21.7	13	34.7	43.5
423.2	H	24.1	20.9	45	46
846.4	V	10.5	29	39.5	46
1269	V	11.3	24.2	35.5	54
1692	H	10.7	25.6	36.3	54

* below 1 GHz readings are quasi-peak, with an IF bandwidth of 120 kHz, above 1 GHz are peak with an IF bandwidth of 1 MHz.

Test Personnel:

Tester Signature _____ Date October 28, 1999

Typed/Printed Name Giuseppe MECCHIA .

7.2 Field Strength Calculation

7.2.1 The field strength is calculated by adding the Antenna and Cable Factor to the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF

where

FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 25.2 dBµV is obtained. The Antenna and Cable Factor of 11.8 is added, giving a field strength of 37 dBµV/m. The 37 dBµV/m value was mathematically converted to its corresponding level in µV/m.

FS = 25.2 + 11.8 = 37 dBµV/m

Level in µV/m = Common Antilogarithm [(37 dBµV/m)/20]= 70.8 µV/m

8 PHOTOS OF TESTED EUT

Fig. 8.1 Front view
Fig. 8.2 Rear view
Fig. 8.3 Front view with cover partially removed
Fig. 8.4 Unit partially disassembled
Fig. 8.5 Controller Board - Components side
Fig. 8.6 Controller Board - Foil side

Fig. 8.1 Front view

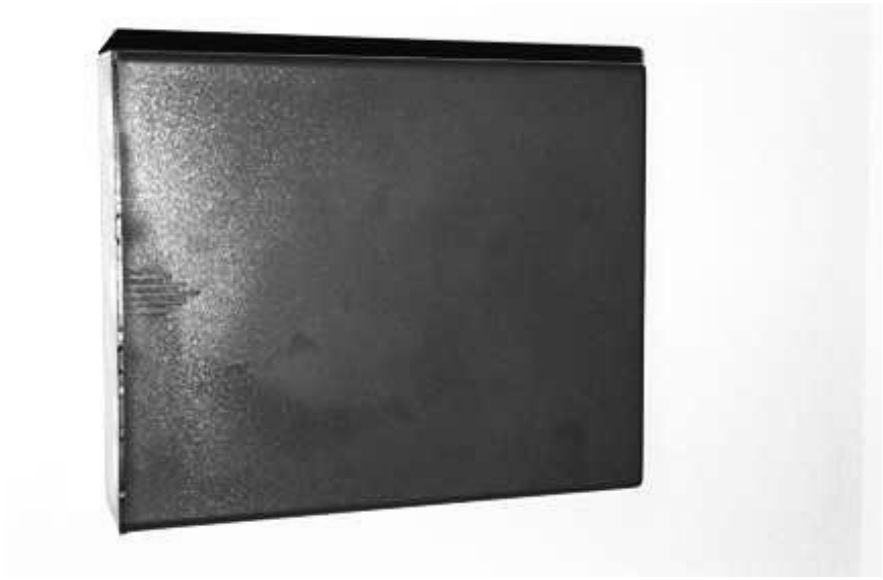


Fig. 8.2 Rear view

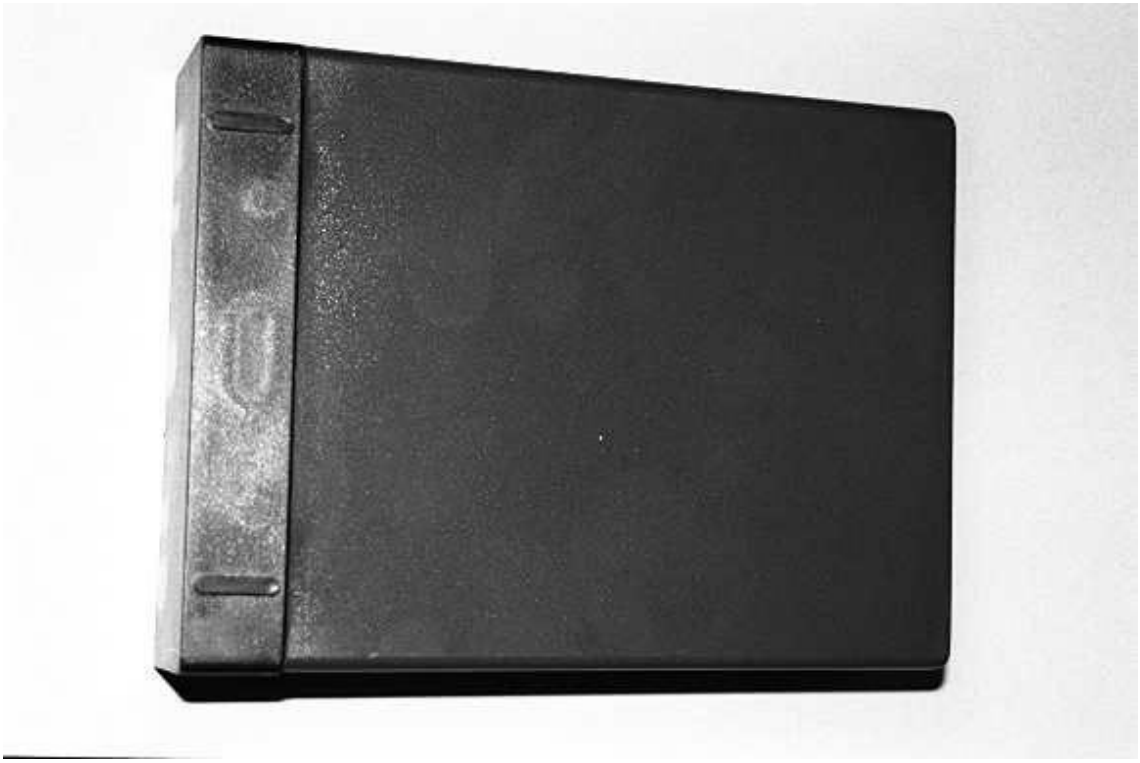


Fig. 8.3 Front view with cover partially removed

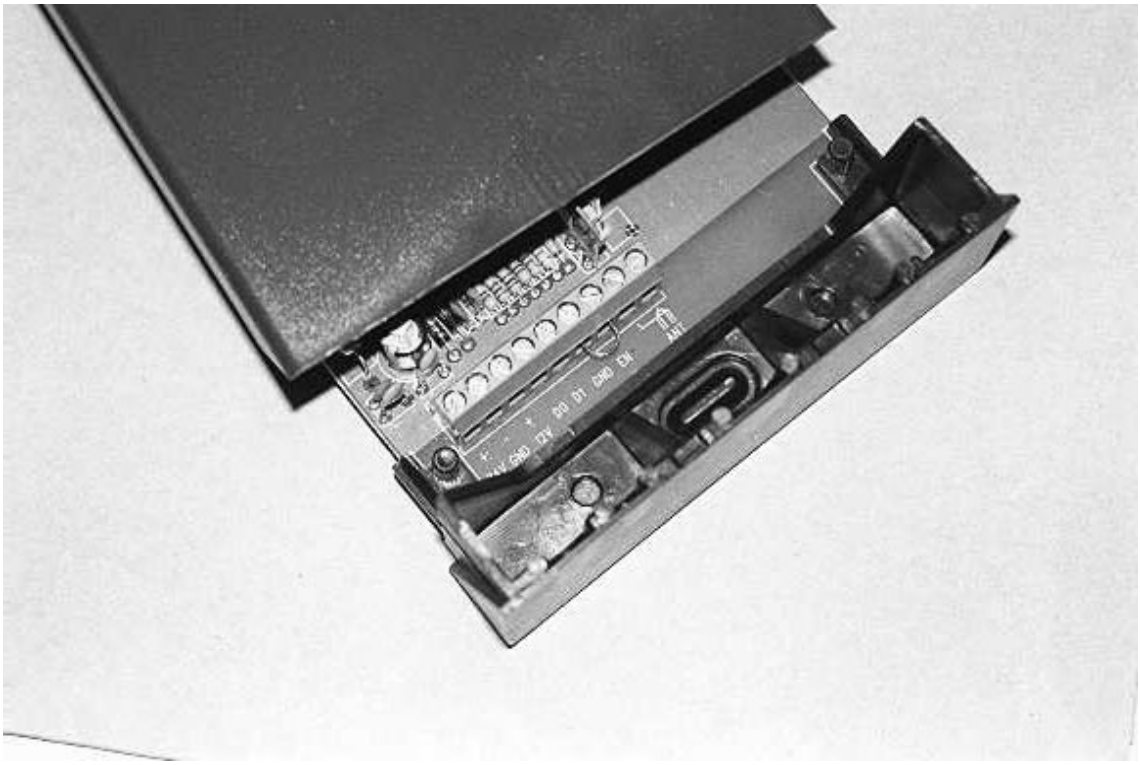


Fig. 8.4 Unit partially disassembled

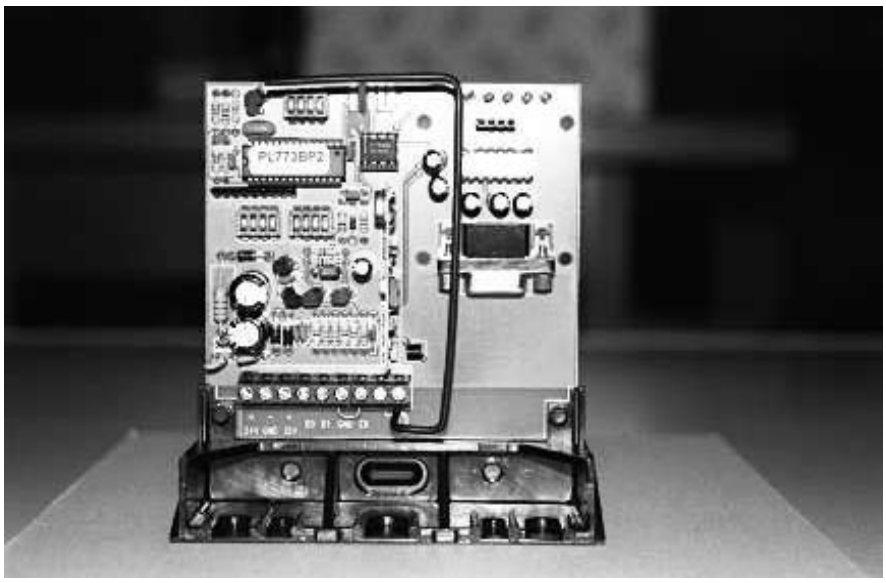


Fig. 8.5 Controller Board - Components side

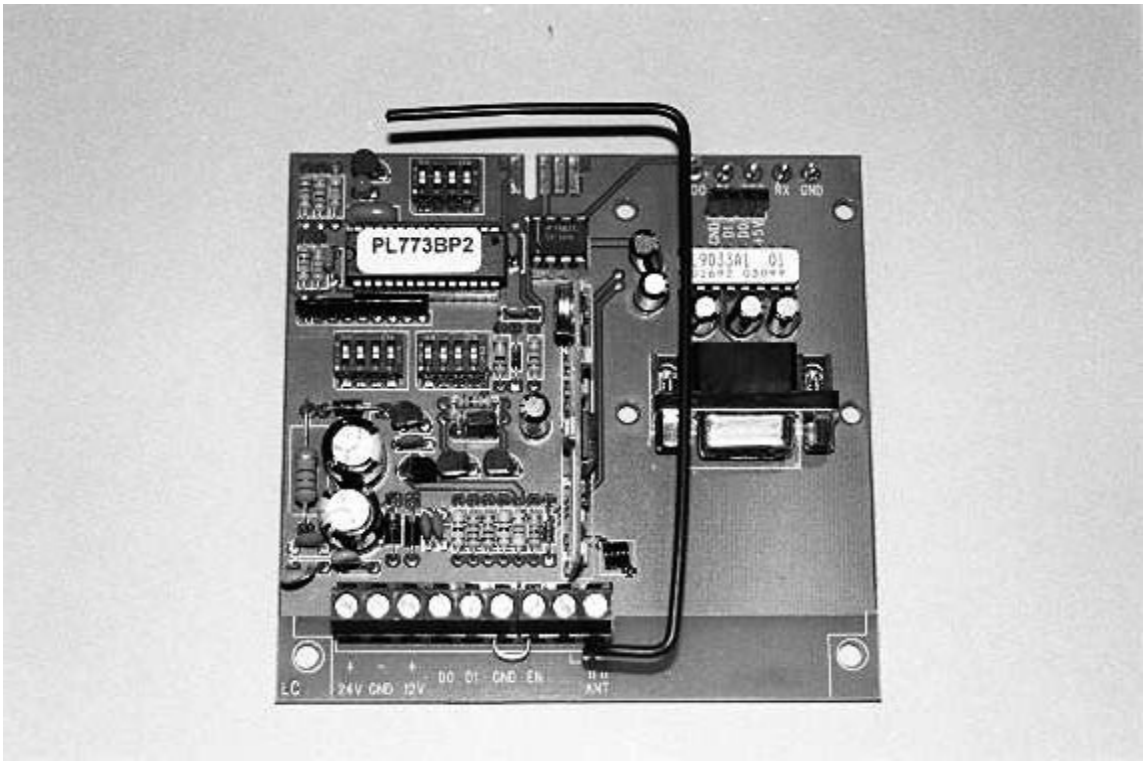
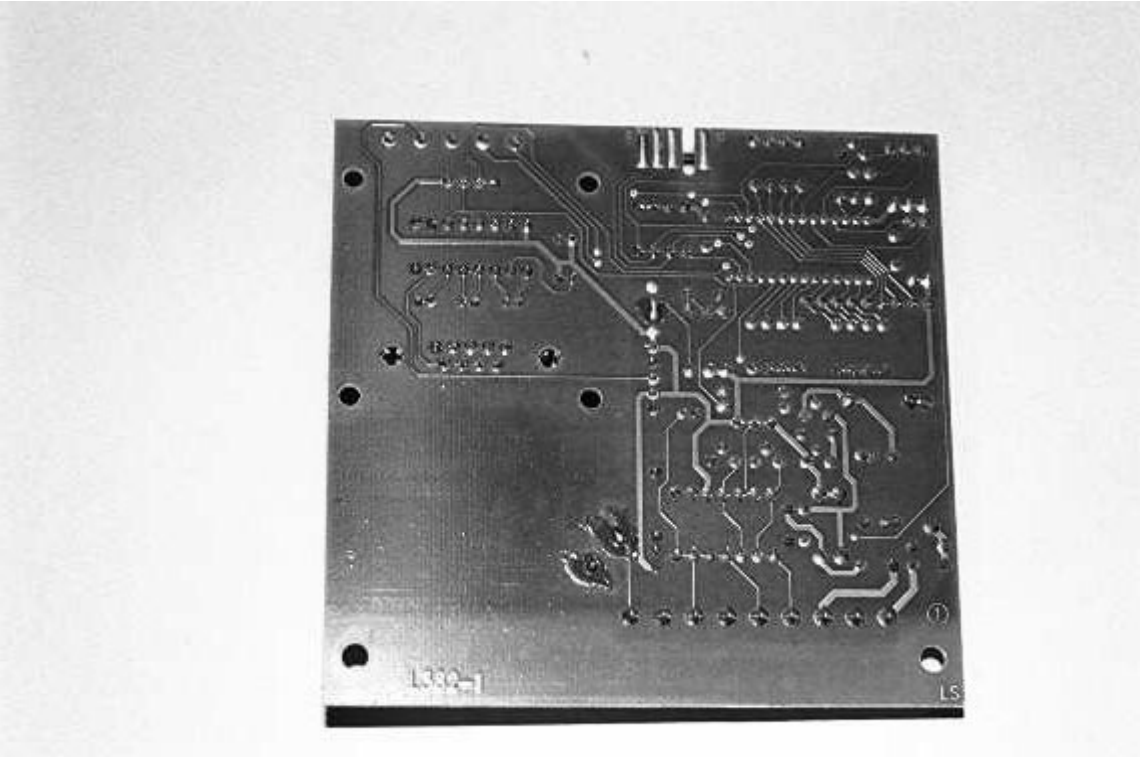


Fig. 8.6 Controller Board - Foil side



User Manual

CAUTION FOR THE USER

Any change or modification of the product is forbidden if not expressly approved by the manufacturer

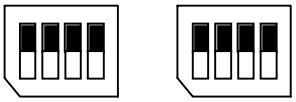
0. DESCRIPTION

The MRRE receiver was designed to be connected to access control central units as a radio reader. The code received from the transmitter is re-sent to the output terminals according to the format and protocol selected by means of the programming dip-switches.
The formats available at the output are those most commonly used in access control systems.

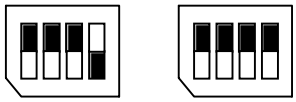
1. TECHNICAL FEATURES

Reception frequency	433.92 MHz
Output code format	Wiegand, Dataclock, TTL, RS232
Code	Digital
Power supply	12 – 24 V ac/dc
Average consumption	30 mA
Signalling devices	red LED

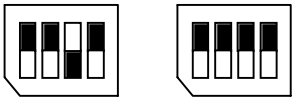
2. SELECTION OF OUTPUT FORMAT AND PROTOCOL WIEGAND



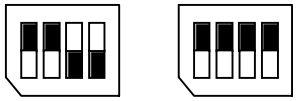
30 bit PRASTEL



37 bit HID

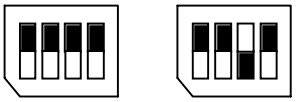


26 bit INDALA

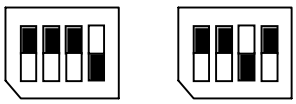


26 bit without site code

DATA CLOCK

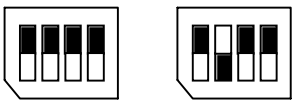


Standard ISO track 2:
start sentinel + 16 digits + end sentinel



Standard ISO track 2:
start sentinel + 16 digits + separator +end sentinel + LRC

TTL



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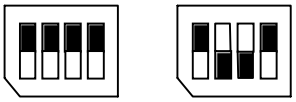
Member of:

Associated

RS232



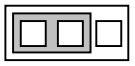
9600 baud, 8 bit, no parity, 1 stop

CHANNEL ADDRESS

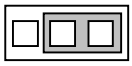
The MRRE receiver can be operated by one or more pushbuttons of the transmitters by means of the channel address dip-switches (see figure)

OUTPUT LEVEL SELECTION

A jumper on the circuit (see figure) makes it possible to select the level of the output signals in the Wiegand, Dataclock and TTL formats.



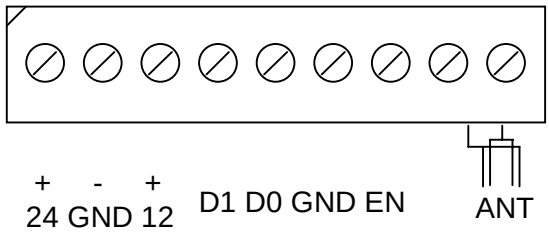
Vout = 12 V



Vout = 5 V

CONNECTIONS

24	24 V ac/dc power supply
GND	Ground
12	12 V ac/dc power supply
D0	Data output: Wiegand: DATA0 Data Clock: DATA TTL: DATA RS232: not used
D1	Data output: Wiegand: DATA1 Data Clock: CLOCK TTL: NOT USED RS232: not used
GND	Ground



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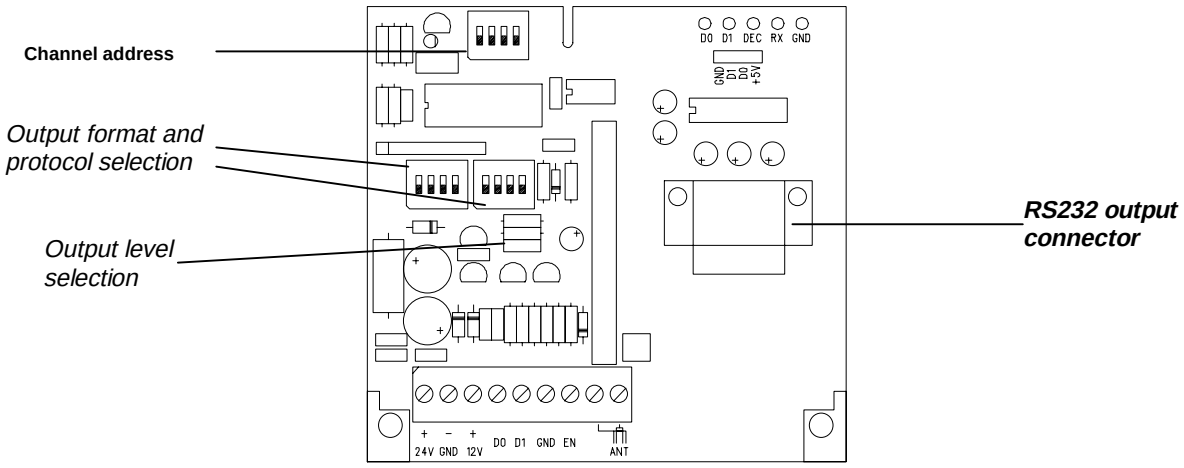
Member of:

Associated

EN	Enable contact
-	Antenna shield
ANT	Antenna

The EN terminal must be connected to GROUND to enable the receiver.



FCC ID: ON3MRRE

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.